



CSCI 1108 Review



The Sense-Decide-Act Loop

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[Robotics Overview and Aseba](#)

[Simulator and Robotics environments](#)

[Sensors and modeling](#)

[Actuators, Kinematic, and Odometry](#)

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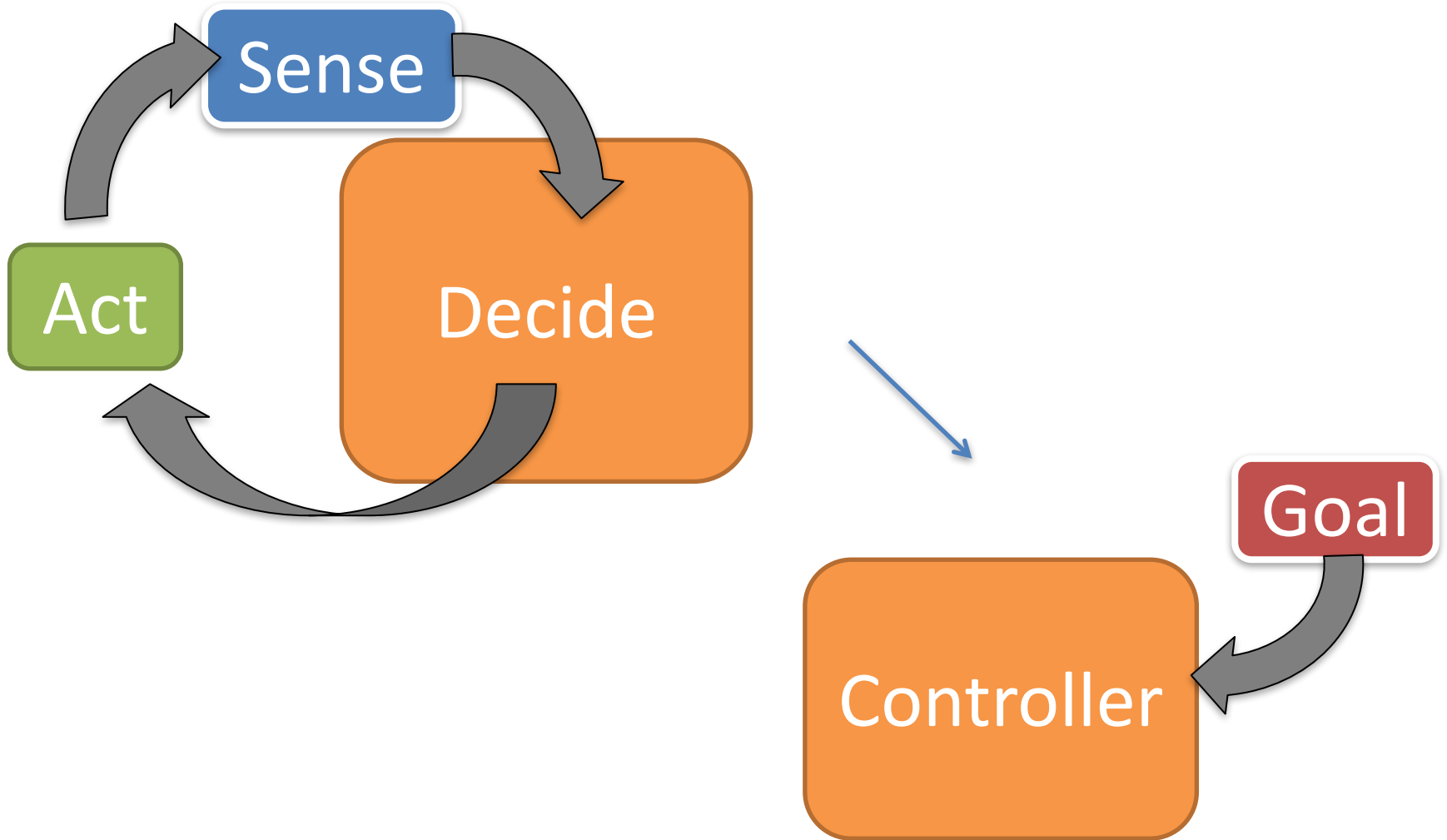
[Localization](#)

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The Sense-Decide-Act Loop



Sensor model

Characterizing sensors

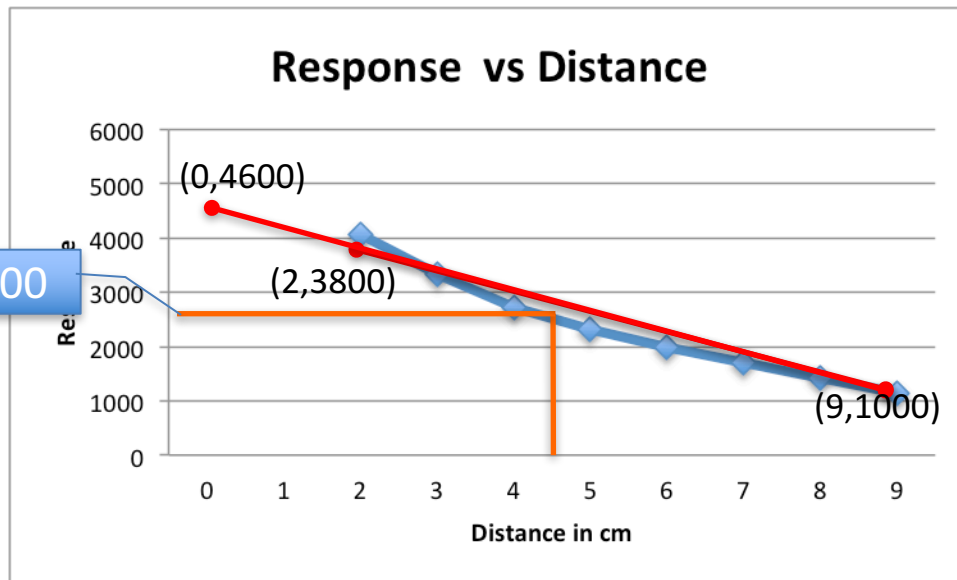
$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1000 - 3800}{9 - 2} \cong -400$$

$$x = 2, y = 3800$$

$$y = mx + b \Rightarrow 3800 = -400 \times 2 + b$$

$$b = 4600$$

$$y = mx + b \Rightarrow y = -400x + 4600$$



Sensors are not perfect

Motion model

Internal model: Calculate from motor commands (such as run the left motor for 2 seconds) the new position (pose)



Again need experiments to calibrate the parameterized model

Combining observations (sensors) and motion (actuators) models

Examples:

Odometry is the use of data from motion sensors to estimate change in position over time (Wikipedia)

Localization: More general techniques such as Kalman filter and Particle Filters, and even SLAM

Programming in event-based framework with ASEBA

Event, Event handler,

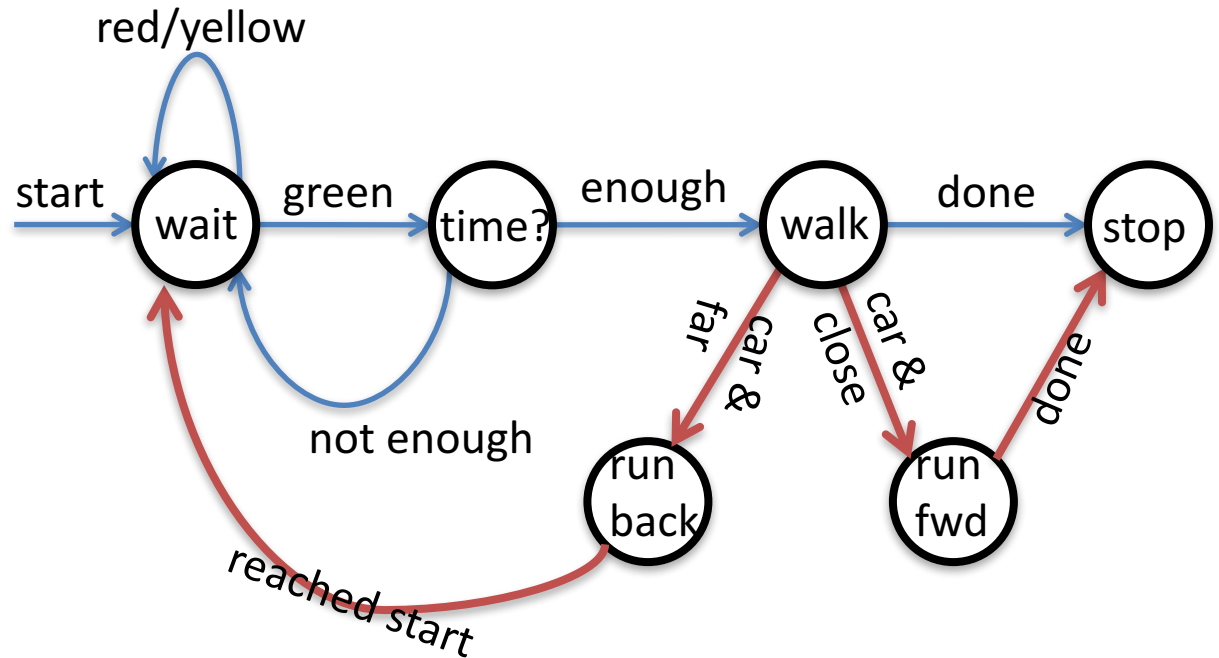
basic constructs like variables and constants, loops, conditional statements, lists, on event, subroutine

High level program planning: State Transition Diagrams

What are states?

What are transition?

Why is this useful?



Failure of strategy and Debugging errors in the code

Detection and mediation

Advanced topics

Search: Some search methods

Localization: Bayes localization versus point estimates

Object recognition: Pattern matching

PID: Set point, why is this useful?

Team Work and Project Management

Teaming

Gantt charts

Components in Project Management